

AMENDMENTS TO THE CLAIMS:

Replace the claims with the following rewritten listing.

1. (Original) Planar optical waveguide comprising
a core region and
a cladding region comprising a photonic crystal material,
said photonic crystal material having a lattice of column elements, wherein at
least a number of said column elements are elongated substantially in an axial direction
for said core region.
2. (Currently Amended) Planar optical waveguide according to claim 1, ~~characterized in~~
~~that~~wherein said core region at least partly is in the form of a defect in said lattice of the
photonic crystal material.
3. (Currently Amended) Planar optical waveguide according to claim 1-~~or~~ 2,
~~characterized in that~~wherein said core region comprises a material having a low effective
index of refraction and ~~that~~ said cladding region involves a higher effective index of
refraction.
4. (Currently Amended) Planar optical waveguide according to claim 3, ~~characterized in~~
~~that~~wherein said cladding region comprises a background material having a first
refractive index-(~~n1~~), ~~that~~ said column of elements comprise a material having a second
refractive index-(~~n2~~), and ~~that~~ said second refractive index (~~n2~~) is higher than said first
refractive index-(~~n1~~).
5. (Currently Amended) Planar optical waveguide according to claim 3, ~~characterized in~~
~~that~~wherein said cladding region comprises a background material having a first
refractive index-(~~n1~~), ~~that~~ said column of elements comprise a material having a second
refractive index-(~~n2~~), and ~~that~~ said second refractive index (~~n2~~) is lower than said first
refractive index-(~~n1~~).

6. (Currently Amended) Planar optical waveguide according to claim 4 ~~or 5~~, characterized in ~~that~~wherein ~~an effective refractive ratio for said cladding region, e.g. a ratio between said second refractive index (n_2) for said column element(s) and said first refractive index (n_1) for said background material, is defined and that said ratio is less than about 2.0.~~
7. (Currently Amended) Planar optical waveguide according to claim 6, ~~characterized in that~~wherein said effective refractive ratio for said cladding region is less than about 1.5; ~~in a more preferred form less than 1.3, in a still more preferred form less than 1.2 and in a still further preferred form less than 1.1.~~
8. (Currently Amended) Planar optical waveguide according to claim 6 ~~or 7~~, ~~characterized in that~~wherein said effective refractive ratio for said cladding region is less than about 1.05; ~~in a more preferred form less than 1.04, in a still more preferred form less than 1.03, and in a still further preferred form less than 1.02.~~
9. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1 –8~~, ~~characterized in that~~wherein said core region comprises a material identical to or similar to a material forming background material of said cladding region.
10. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1 –9~~, ~~characterized in that~~wherein said columns elements comprises a material containing impurity elements, ~~e.g. Germanium doted into silica glass.~~
11. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1 –10~~, ~~characterized in that~~wherein said waveguide comprises at least one of a glass materials, a semiconductor materials, and/or a polymer materials.
12. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1 –11~~, ~~characterized in that~~wherein said cladding region comprises a background material comprising ~~or consisting of~~ SiO₂ and ~~that~~ said background material has a first refractive

index (n_1), wherein $1.4 \leq n_1 \leq 1.5$, in a more preferred form $1.43 \leq n_1 \leq 1.47$, and in a still more preferred form $1.44 \leq n_1 \leq 1.45$.

13. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–11~~, characterized in that wherein said cladding region comprises a background material comprising ~~or consisting of~~ Si and that said background material has ~~having~~ a first refractive index (n_1), wherein $2.5 \leq n_1 \leq 3.0$, in a further preferred form $2.6 \leq n_1 \leq 2.9$, and in a still further preferred form $2.7 \leq n_1 \leq 2.8$.

14. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–11~~, characterized in that wherein said cladding region comprises a background material comprising ~~or consisting of~~ a Group III-V material and that said background material has ~~having~~ a first refractive index (n_1), wherein $3.0 \leq n_1 \leq 4.5$, in a further preferred form $3.3 \leq n_1 \leq 4.3$, and in a still further preferred form $3.7 \leq n_1 \leq 4.0$.

15. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–14~~, characterized in that wherein said column elements comprise a material comprising ~~or consisting of~~ SiO₂ and that said material has ~~having~~ a second refractive index (n_2), wherein $1.0 \leq n_2 \leq 1.5$, in a preferred form $1.4 \leq n_2 \leq 1.5$, in another preferred form $1.43 \leq n_2 \leq 1.47$, and in a still further preferred form $1.44 \leq n_2 \leq 1.45$.

16. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–14~~, characterized in that wherein said column elements comprise a material comprising ~~or consisting of~~ Si and that said material has ~~having~~ a second refractive index (n_2), wherein $1.0 \leq n_2 \leq 3.0$, in a preferred form $2.5 \leq n_2 \leq 3.0$, in another preferred form $2.6 \leq n_2 \leq 2.9$, and in a still further preferred form $2.7 \leq n_2 \leq 2.9$.

17. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–14, characterized in that~~wherein said column elements comprise a material comprising ~~or consisting of~~ a Group III-V material and ~~that said material has~~having a second refractive index (n_2), wherein $1.0 \leq n_2 \leq 4.5$, ~~in a preferred form $3.0 \leq n_2 \leq 4.5$, in another preferred form $3.3 \leq n_2 \leq 4.3$, and in a still further preferred form $3.7 \leq n_2 \leq 4.0$.~~

18. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–17, characterized in that~~wherein said lattice of column elements comprises a lattice constant (L), ~~that a normalized wavelength l/L is defined by means of said lattice constant (L) and a wavelength (l) for optical waves propagated by the waveguide, and that said cladding region comprises a background material comprising or consisting of SiO_2 , wherein $L/l < 1.0$, in a further preferred form $0.1 < L/l < 0.8$, and in a still further preferred form $0.2 < L/l < 0.5$.~~

19. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–17, characterized in that~~wherein said lattice of column elements comprises a lattice constant (L), ~~that a normalized wavelength l/L is defined by means of said lattice constant (L) and a wavelength (l) for optical waves propagated by the waveguide, and that said cladding region comprises a background material comprising or consisting of Si~~ wherein $L/l < 2.0$ ~~and in a further preferred form $L/l < 1.5$.~~

20. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–17, characterized in that~~wherein said lattice of column elements comprises a lattice constant (L), ~~that a normalized wavelength l/L is defined by means of said lattice constant (L) and a wavelength (l) for optical waves propagated by the waveguide, and that said cladding region comprises a background material comprising or consisting of a~~ Group III-V material, wherein $L/l < 3.0$.

21. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1–20, characterized in that~~wherein said cladding region comprises a background material

having a first refractive index (n_1) , and ~~that~~wherein an effective guided mode index is lower than said first refractive index (n_1) .

22. (Currently Amended) Planar optical waveguide according to ~~one or more of claims 1—21, characterized in that~~wherein said column elements comprise a material having a second refractive index (n_2) , and ~~that~~wherein an effective guided mode index is lower than said second refractive index (n_2) .

23. (Currently Amended) Optical device comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

24. (Currently Amended) Optical device comprising an optical amplifier further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

25. (Currently Amended) Optical device comprising a laser further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

26. (Currently Amended) Optical device comprising an optical filter further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

27. (Currently Amended) Optical device comprising an add-drop multiplexer further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

28. (Currently Amended) Optical device comprising an optical splitter further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

29. (Currently Amended) Optical device comprising a wavelength converter further comprising a planar optical ~~device~~waveguide according to ~~one or more of claims 1—22~~.

30. (Currently Amended) Optical device comprising means for performing an optical switching, a controllable coupling, or a transferal of optical waves, said optical device further comprising a planar optical device according to ~~one or more of~~ claims 1—22.

31. (Currently Amended) Optical device according to claim 30, ~~characterized in that~~wherein said means for performing an optical switching, a controllable coupling, or a transferal of optical waves comprise a movable coupling element ~~(33, 43)~~.

32. (Currently Amended) Optical device according to claim 31, ~~characterized in that~~wherein the device comprises means for actuating said movable coupling element ~~(33, 43)~~.

33. (Currently Amended) Optical device according to claim 32, ~~characterized in that~~wherein said means for actuating said movable coupling element ~~(33, 43)~~ involve the use of mechanical means, means sensitive to heating and/or cooling, means sensitive to pressure, and/or means sensitive to electromagnetic fields ~~etc.~~

34. (Currently Amended) Optical device according to ~~one or more of~~ claims 30—33, ~~characterized in that~~wherein said device comprises micro-flow means associated with said optical switching, controllable coupling, or transferal of optical waves.

35. (Currently Amended) Optical device according to claim 34, ~~characterized in that~~wherein said micro-flow means involves utilization of a fluid, ~~in particular~~comprising two or more fluid elements having different refractive indices.

36. (Currently Amended) Optical device according to claim 35, ~~characterized in that~~wherein said two or more fluid elements comprised in said micro-flow system are separated by mechanical means or ~~preferably that~~ said two or more fluid elements are non-mixable fluid elements or essentially non-mixable fluid elements

37. (Currently Amended) Method of making ~~a planar optical waveguide, in particular a~~ planar optical waveguide according to ~~one or more of~~ claims 1 —22, comprising steps ~~involving~~ multi-layer depositing and/or processing.

38. (Currently Amended) Method according to claim 37, ~~characterized in that~~ further comprising said steps comprise depositing, etching and/or lithographic processes.

39. (Currently Amended) Method of making ~~a planar optical waveguide, in particular a~~ planar optical waveguide according to ~~one or more of~~ claims 1 —22, comprising steps ~~involving~~ laser induced refractive index changes.

40. (Currently Amended) Method of making ~~a planar optical waveguide, in particular a~~ planar optical waveguide according to ~~one or more of~~ claims 1 —22, comprising stepsutilizing ~~involving~~ self-writing waveguides.

41. (Currently Amended) Method of making ~~a planar optical waveguide, in particular a~~ planar optical waveguide according to ~~one or more of~~ claims 1 —22, comprising steps ~~involving~~ ion implantation.

42. (New) Planar optical waveguide according to claim 5, wherein a ratio between said second refractive index for said column element(s) and said first refractive index for said background material, is defined and said ratio is less than 2.0.

43. (New) Planar optical waveguide according to claim 42, wherein said effective refractive ratio for said cladding region is less than about 1.5.

44. (New) Planar optical waveguide according to claim 42, wherein said effective refractive ratio for said cladding region is less than about 1.05.